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Citation for final published version:

Sarayreh, Bashar, Mardawi, Ammar and Aldmour, Rakan 2012. Comparative study: the Nonaka model of knowledge management. International Journal of Engineering and Advanced Technology 1 (6) , pp. 45-48. file

Publishers page: <http://www.oalib.com/paper/2087615#.XGVDY1X7REY>
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Comparative Study: The Nonaka Model of Knowledge Management

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Abstract— Knowledge Management went through a major transition from straightforward models which focused on the dichotomy of tacit and explicit knowledge to sophisticated frameworks which included specific processes. In this paper we outline the emergence of knowledge management as a distinct academic discipline to locate Nonaka's work. Our immediate objective is to provide a comprehensive comparison of the most noteworthy discussions and criticism of the Nonaka model for Knowledge Management before and after the year 2000. Finally, we close by considering a series of key examples of the Nonaka model as deployed in industry.

Up to the year 2000 or thereabouts, it was augured the model was rather simplistic and the desire to codify everything was not possible. Much of the critique of Nonaka following 2000 focused on the seeming subjectiveness of his vision of knowledge and the inadequacy of the SECI structure in a time of radically different communication technologies [5][6][11]. Finally, we show that most of published case studies on the idea of converting tacit knowledge to explicit in the ICT sector are out of date[1][3].

We conclude that knowledge management, conversion, and codifying requires further research and development to take in consideration the tacit origins of knowledge and the rapidly changing methods of communication.

Index Terms— Knowledge Management, Nonaka's Model, knowledge codifying, SECI model

I. INTRODUCTION

This paper is intended to provide an introduction to the model of Knowledge Management (KM) that was proposed by Nonaka [1][2], and the debates that have surrounded it. The paper begins by briefly outlining the emergence of knowledge management as a distinct academic discipline, so as to properly locate Nonaka's work. Following this, Nonaka's work is presented in to broad tranches; first, the original model that he proposed in 1995, followed by the revised edition produced in 2009. The report then goes on to consider some of the key debates that have surrounded the Nonaka model, broadly split into two tranches of pre-2000 and post-2000. The report then closes by considering a series of key examples of the Nonaka model as deployed in industry.[1][3]

II. THE EMERGENCE OF KNOWLEDGE MANAGEMENT

Knowledge Management as a legitimate area of research enquiry emerged in the early 1990's. At its core knowledge management is about trying to harvest all the insights and experience that go into making an organization function. It started out as a research area for practitioners rather than as

an academic endeavor, famously through Skanda, the Scandinavian company that was the first company in the world to create a role specifically positioned around Knowledge Management. [4]

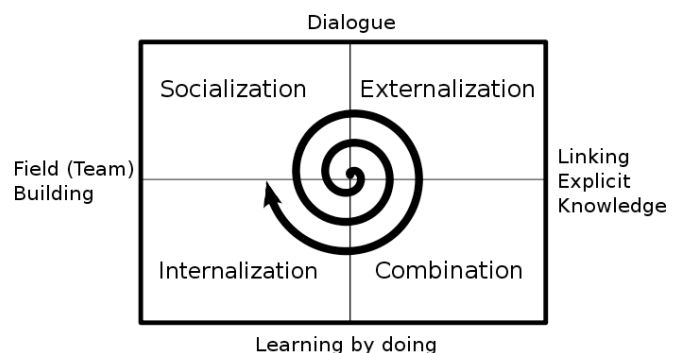
Early models of Knowledge Management were very straightforward and focused on the ideas of tacit knowledge and explicit knowledge; tacit knowledge may be insight and experience that the individual may not know that they are actively using, whereas explicit knowledge is knowledge that the individual is consciously deploying. According to the early pioneers of Knowledge Management the challenge of their industry was to develop mechanisms to make implicit knowledge explicit, while allowing for explicit knowledge to be made individually meaningful.

However, the fundamental problem with this model is that it is really rather simplistic, and it lacks the nuance and sophistication to be made useful across different companies, countries and across time.[5]

III. NONAKA

Nonaka's key contribution to the literature in the first instance was to argue that the first step to making a more sophisticated model was to think through how knowledge might be actually transferred, and he noted that for that to happen, knowledge has to be transformed to information, and only then can it be moved. Following this, Nonaka developed his signature model of how such information might be transferred. His model essentially proposed that there was a dynamic intertwining of tacit and explicit knowledge, such that tacit knowledge is extracted to become explicit and is then re-internalized as tacit. [1]

Nonaka developed his ideas in a series of papers throughout the early 1990's [12][13], culminating in the 1995 book with Hirotaka, The Knowledge Creating Company: how Japanese companies create the dynamics of innovation. Through these publications Nonaka sought to establish a sense of dynamism in the knowledge transfer model, and to this end he proposed the SECI model:



The process that transfers tacit knowledge in one person to tacit knowledge in another person is socialization. It is experiential, active and a "living thing," involving capturing

Manuscript received on August, 2012.

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knowledge by walking around and through direct interaction with customers and suppliers outside the organization and people inside the organization. This depends on having shared experience, and results in acquired skills and common mental models. Socialization is primarily a process between individuals. [1][2][12][13]

The process for making tacit knowledge explicit is externalization. One case is the articulation of one's own tacit knowledge - ideas or images in words, metaphors, analogies. A second case is eliciting and translating the tacit knowledge of others - customer, experts for example - into a readily understandable form, e.g., explicit knowledge. Dialogue is an important means for both. During such face-to-face communication people share beliefs and learn how to better articulate their thinking, though instantaneous feedback and the simultaneous exchange of ideas. Externalization is a process among individuals within a group.[1]

Once knowledge is explicit, it can be transferred as explicit knowledge through a process Nonaka calls combination. This is the area where information technology is most helpful, because explicit knowledge can be conveyed in documents, email, data bases, as well as through meetings and briefings. The key steps collecting relevant internal and external knowledge, dissemination, and editing/processing to make it more usable. Combination allows knowledge transfer among groups across organizations.[1]

Internalization is the process of understanding and absorbing explicit knowledge in to tacit knowledge held by the individual. Knowledge in the tacit form is actionable by the owner. Internalization is largely experiential, in order to actualize concepts and methods, either through the actual doing or through simulations. The internalization process transfers organization and group explicit knowledge to the individual.[1]

Within a company, there are five enablers for knowledge creation; vision, strategy, structure, system, and staff. A knowledge vision is a working premise for knowledge. Examples are:

- 3M Innovation: Thou shalt not kill a new idea.
- Walt Disney: Continuous progress via creativity, dreams and imagination. No cynicism allowed.
- Sharp: Opt electronics. Don't imitate, make a product to be imitated.

Strategy conceptualizes what knowledge to develop. Nonaka gave two contrasting aspects of strategy.

A product strategy leads to "product identification", with fixed and separate resource perception leading to inefficient new product development. Product strategy leads to a management strategy based on physical assets. Organizations deploy product portfolios; the organization is structured as a strategic business unit making specific products; and there is a defined product / market boundary. In short, the organization optimizes on making specific things.[1]

Compare the product strategy with a knowledge strategy. In a knowledge strategy, identification is around core knowledge, with flexible linkage corresponding to markets. This results in efficient new product development. Additionally, with the knowledge strategy the products are linked, while in a product strategy they are separate. Management based on knowledge assets and their use focuses on creating and disseminating knowledge vs. things.

Work units must be designed to facilitate and enable the self-organizing nature of knowledge. Such organizations are boundary-less, but are constrained by cognitive limits of individuals.

The next enabler is system, which Nonaka describes as networking communities of knowledge, to competitors, customers, related industries, regional communities, and subsidiaries. It also includes the knowledge vision, a knowledge conversion system and processes as well as a knowledge base.[1]

Nonaka gave Sharp as an example. Structures at Sharp include the corporate innovation system for technology and products, with a corporate technology conference whose purpose is to identify potential for technological development. One method of doing so is to identify urgent development project teams.[1]

Such teams have broad powers to recruit personnel and procure equipment and/or facilities, are budgeted by headquarters, span more than 3 business groups, and normally have a deadline with 18 months. A visible sign of their power and authority is a Gold Badge. Additionally, this innovation system has a new planning group to focus on market needs. One way to do this are the new lifestyle planning groups, which includes collaboration on research with companies in other industries. Another group is the trend leader system of 600 leading consumers ranging from high school students to senior citizens. This group reviews new product concepts, and then breaks into smaller focus groups.[1]

The fourth enabler is structure. Nonaka discussed two forms of organization, asserting that one management challenge is to maintain a balance between the fractal organization, which he categorized as self-organizing, capable of great speed and agility, and especially good at socialization and externalization. In contrast is the bureaucracy, with a hierarchy, division of labor and specialization, which is especially good at combination and internalization. Both of these are necessary. [1]

The last enabler is staff. In this area, Nonaka stressed the importance of middle managers in what he called a "Middle-Up-Down Process" of knowledge transfer. The role of the middle manager is to support, nurture, care about, initiate and complete the knowledge spiral. They play the critical role between the "Grand Theory (what ought to be)" from the top, and the "Front-line (what reality is)". They translate Grand Theory into Mid-range theory, which is then tested on the front line. Contradictions flow back to the Middle manager, which must then be communicated to and resolved with top leaders. The action in the middle is the "Cross-leveling of knowledge." [1]

With this model Nonaka was attempting to present a conceptualization of how tacit knowledge could be made explicit knowledge, and then re-internalized. The idea behind this being that the process is dynamic, and should not be thought of necessarily in discrete stages, but as a vortex of information transfer. In this first iteration of the model, the emphasis was very much on the codification of knowledge, such that it can be moved around an organization. For this to happen, Nonaka argued, knowledge had to be turned into information. This was to be achieved through turning tacit knowledge into transferrable information through such things as knowledge databases, or knowledge banks.

Nonaka actually based some of his model on the work of

Polanyi (1962) who argued that knowledge within an organization could be thought of as on a continuum from explicit to tacit, and that each could not be disconnected from the other, which fueled Nonaka's interest in the dynamism of knowledge transfer.

IV. DEBATING NONAKA – PRE 2000

The Nonaka model was contested in two specific ways, up to the year 2000 or thereabouts, on two specific counts. First, from an academic point of view it was argued that while the model was an advance on simply presenting knowledge as a dichotomy of tacit/explicit, it was still woefully simplistic. In particular, many questioned the obsession with codifying knowledge so that it might be transferred. It was argued that this desire to codify everything was not possible with many forms of knowledge.[7]

Second, and from a practitioner point of view, it was considered far too abstract to be a useful operation model within companies. Knowledge Management was a discipline that emerged out of practitioners work, and in some ways this was considered as an over-intellectualization of practical solutions. Nonaka later proposed a second model, called ba, which roughly translates to place (1998). His justification for doing this was because knowledge could be considered boundary-less, dynamic and intangible, and is not something that could be stockpiled, and he therefore felt that his original model attempted to place too much order on what are ultimately intangible things. Nonetheless, the central SECI Matrix as described above survives and is very much in use today.[8]

The theory appears to have attracted little systematic criticism, at least not in management and organizational studies literature. The most far-reaching critique is by Essers and Schreinemakers (1997). They praised Nonaka for recognizing that the capacity for corporate action depends on ideas and beliefs as much as on scientific knowledge but concluded that his subjectivism tended towards a dangerous relativism because he made justification a matter of managerial authority, and neglected to consider how scientific criteria relate to corporate knowledge. Second, he failed to recognize that the commitment of different groups to their ideas and the resulting need to resolve this conflict by managerial authority cannot bode good for creativity and innovation.[5]

Another comprehensive critique (Jorna, 1998) charged Nonaka with overlooking learning theory, earlier discussion of tacit and explicit knowledge, with misreading important organizational writers, and of not using better accounts of western philosophy.[11] Bereiter (2002, pp. 175-179) argued Nonaka's model does not explain how new ideas are produced, nor how depth of understanding (necessary for expertise) develops. Further, their model of knowledge work is unconvincing, and they make collaborative work a mystery. These are not the only criticisms, but they are some of the most comprehensive and serious.[6]

V. DEBATING NONAKA – POST 2000

The core difference between debates before 2000 and after was that the Knowledge Management practice was being reframed by the widespread emergence and adoption of information technology. Nonaka added significantly to

his repertoire over the years, with a second book with von Krogh (2000) that focused on the enablers of knowledge creation as described above.

Much of the critique of Nonaka following 2000 focused on the seeming subjectiveness of his vision of knowledge, and the inadequacy of the SECI structure in a time of radically different communication technologies. Gourlay (2003; 2006a; 2006b) has been the sternest critic of Nonaka in this period, and has charged that the SECI model is deeply flawed, and that Nonaka flirts with relativism in the way he conceives of knowledge. In essence, Gourlay has argued that Nonaka's view of knowledge and the SECI model are flawed on the basis that the explanations that Nonaka gives for its operation are unnecessarily complicated and all the examples that are given could be explained via much easier methods. [8][9][10]

Gourlay's work demonstrates the consensus that the SECI model seems to be based on little more than some vague ideas about knowledge, and some very subject examples, none of which can be verified or borne out by empirical study. Moreover, when people try to empirically test the model they find that it does not stand up to scrutiny. The model assumes a uni-dimensional view of knowledge that simply does not hold water; for example, there is no consideration of the fact that some knowledge is inherently tacit, and cannot be converted.[8]

VI. CASE STUDIES

Nonaka himself provided a lengthy case study of his work with two ICT companies – namely Canon and Apple, but from 1991 which makes it substantially out of date. [1]

Several case studies have been conducted over the years across a range of industries. In ICT probably the most developed case study is that provided by Laupase & Fink (2002) on the idea converting tacit knowledge to explicit knowledge in consulting firms, but this is again somewhat out of date.[4]

For a much more contemporary analysis of the model in action, then Aghdasi & Tehrani (2010) provide a detailed analysis of the SECI model in an auto-manufacturing sector. Aghdasi & Tehrani (2010) examined a process audit in an auto-factory. The SECI model was used to identify the roles of different activities in a process audit, and how each activity contributes towards creating knowledge. They examined the process for examples of clear SECI cycles, utilising a statistical approach. They identified several areas where these SECI cycles were being 'disrupted' and where they could pinpoint better information sharing opportunities to improve the levels of knowledge transfer.[3]

VII. CONCLUSION

While the Nonaka's model of knowledge management played a critical role in understanding how to transfer knowledge into information, many critics pointed out major weaknesses. Most of the discussion before the year 2000 augured the model was rather simplistic and the desire to codify everything was not possible. On the other hand, after the year 2000, critics focused on the seeming subjectiveness of Nonaka's vision of knowledge and the inadequacy of the SECI structure in a time of radically different communication technologies.

While several case studies have been made on how

organization are applying and practicing knowledge management, case studies in the ICT sector are mostly out of date. In addition to that, knowledge management, conversion, and codifying requires further research and development to take in consideration the tacit origins of knowledge and the rapidly changing methods of communication.

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